RE-DISCOVERY OF A LITTLE KNOWN VICTORIAN FROG.

By Stephen J. Copland.

(One Map.)

[Read 25th October, 1961.]

Synopsis.

The little known Victorian frog *Hyla maculata*, which was described in 1901 by Spencer from a single specimen and which had apparently not been collected since, is now established as valid by the examination of three further specimens. Its range is extended by 150 miles and additional information is adduced. A standard description is also given to facilitate comparison with other members of the genus *Hyla* as presented in the author's 1957 paper. A neotype of *Hyla irrorata* De Vis is designated.

On December 29, 1958, my daughters Janet and Christina collected two frogs at Lightning Creek, on the Omeo Highway, in Eastern Gippsland, Victoria. These both turned out to be males of the tree-frog *Hyla maculata*, described by Spencer in 1901 from a single specimen from Powong, now spelt Poowong, about 150 miles south-west of Lightning Creek. The 1958 frogs appear to be the second and third individuals collected in 57 years. They extend the range of the species 150 miles. On January 4, 1959, I collected a further specimen near Glenrowan, about 70 miles west of Lightning Creek. These three frogs completely establish the validity of *maculata*, which had been in doubt.

Map of eastern Victoria. Localities at which *Hyla maculata* has been collected are underlined. Several large towns are shown for reference.

Spencer's short original description (1901: 177) reads: *Hyla maculata*, sp. n. Tongue subcircular, free and slightly nicked behind. Vomerine teeth in two small groups close to the middle line behind the level of the choanae. Head decidedly broader than long. Snout as long as broad; truncate and slanting downwards so that the nares are vertically on a level with the margin of the upper jaw. Canthus rostralis distinct; the loreal region oblique and slightly concave; interorbital space nearly twice as broad as the upper eyelid. Tympanum not visible. Fingers very slightly webbed; toes completely webbed. Discs on the fingers slightly larger than those on the toes. Subarticular tubercle present, no outer metatarsal tubercle. A distinct fold extending over

the tympanic region to the shoulder. The hind limb being carried forwards, the tibio-tarsal articulation reaches the anterior canthus of the eye. Upper surface of the body covered with minute pits, the closely opposed margins of which present a finely reticulate appearance; lower surface granulate. A distinct fold along the inner edge of the tarsus. Colour, olive grey above, blotched with darker markings; the same on the upper surfaces of the limbs. Length from snout to vent, 50 mm. Habitat, Poowong, Victoria. Collected by Mr. R. Hall.

Description of No. A.C.6877, a male, Lightning Creek, Victoria, 29.xii.1958.

Habitus moderately slender with fairly long limbs, length of head and body 29 mm.; head smoothly triangular, very slightly broader than long (11 × 10·5 mm.); snout blunt and short (4·5 mm.), but the strongly incurved canthus rostralis makes it appear prominent, one and a half times diameter of eye (3 mm.), rounded when seen from above, in profile curved and receding, strongly overhanging lower lip; canthus rostralis curved, distinct and angular; lores distinctly concave, sloping inwards from jaw to canthus rostralis; interorbital width about 1·6 times that of an upper eyelid (4 to 2·5 mm.), top of head flat between prominent eye bulges; internasal space 3 mm.; diameter of eye equals its distance from nostril; tympanum very indistinct, surface practically the same as surrounding skin, but portion of the anterior border can be distinguished in a certain light and position, it appears to be elliptical with longer axis directed forward and upward, contained in diameter of eye about three times, distance from eye 1 mm.; a strongly marked supratympanic ridge runs from eye to above shoulder.

Skin on the back and limbs at first glance smooth, but in detail uniformly and minutely pitted; a very few low, rounded but quite distinct warts dorsally, becoming more plentiful dorso-laterally; chin, throat and particularly abdomen coarsely granulate; postero-ventral surfaces of thighs granulate and area about anus extremely so; no or obscure pectoral fold; small flaps at knees; small anal flap, narrow, not very pronounced, tarsal fold.

Forelimb moderately strong and long (16 mm.), 55% of length of head and body; hand 8 mm.; finger discs distinct though not large, about half diameter of eye (1·5 mm), rounded with concave, cup-like undersurfaces; fingers in order of length, 1, 2, 4, 3; fingers only slightly webbed at base, extent of webbing, 10, 18 and 12%; subarticular tubercles small but distinct; large tubercle along thumb and three large tubercles at outer side of palm, arranged in shape of a U.

Hindlimb moderately long and robust, length (46 mm.) 160% of head and body; femur 13 mm., tibia 16 mm., foot 18 mm.; heel reaches just short of snout; toe discs elongated, small, hardly wider than toes and only about half size of finger discs, the discs are blackish, as are the subarticular tubercles and inner metatarsal tubercle, and very conspicuous; toes in order of length, 1, 2, 3, 5, 4; all toes nearly completely webbed, web extending to all discs except outer sides of 2nd, 3rd and 4th, extent of webbing, 90, 92, 93 and 100%; very narrow fringes on the short unwebbed sections of toes; subarticular tubercles small but distinct; sole with very small, low tubercles in lines; inner metatarsal tubercle elongated, not large but prominent, no outer one.

Vomerine elevations paired, quite small, rounded, distinctly separated from each other and widely separated from the choanae, each smaller than one of the choanae, which are themseves small and rounded, elevations completely behind choanae; tongue almost round, free and slightly indented behind, at least half width of mouth at angle of jaws; no external vocal sac.

Dorsal colour of body and limbs rather dark bluish grey with obscure blackish mottling and markings; posterior and dorsal surfaces of thighs with a good deal of yellow; warts and shagreening on sides and tympanic area whitish; chin, throat and anterior part of abdomen nearly white, remainder of abdomen and ventral surfaces of limbs yellow. These colours were noted in life and have changed little in three years of preservation.

Variation.—Another male, A.C.6876, was collected with A.C.6877. The two specimens resemble each other almost exactly. A.C.6876 has a head and body length of 26 mm. The tympanum can fairly be described as "not visible", although as in A.C.6877 a

relatively flattened area of the rough skin can be recognized with a hand lens if carefully sought. A narrow and not very prominent black line, which is very inconspicuous in A.C.6877, runs from the nostril through the eye to over the shoulder. A.C.6924, an almost completely metamorphosed frog with head and body length 26 mm. and unabsorbed tail 4 mm., was found under a plank beside a pond near the Hume Highway 2·5 miles south of Glenrowan. It was much paler than adults, and dotted and flecked sharply with black rather than mottled. Toes were all completely webbed to the discs, even more so than in adults, and the fingers were slightly more webbed. The tympanum was not visible. A recently occluded gill cleft slants downwards and backwards at an angle of about 45 degrees to the horizontal from just behind the eye to the base of the forelimb on each side. The tongue, which is only a late larval development, is only about half the size of that of A.C.6876, a young adult with identical head and body length. The vomerine elevations in both A.C.6876 and 6924 are slightly more anterior than in A.C.6877, being partly between the choanae.

Discussion.—Spencer's original description is so good that any modifications based on the two new Lightning Creek specimens are only minor. It may be mentioned here that the position of the species in the key given by Copland (1957: 12) still stands, but can be made more strictly accurate by changing "tympanum not visible" to tympanum covered by rough skin and practically invisible, and for "olive grey back" olive or bluish grey back. The head is quite broad and the difficulty of measuring to the posterior border of the tympanum probably accounts for Spencer's "head decidedly broader than long". The situation as regards the tympanum is discussed above with A.C.6876 and 6877. The colour of these two specimens is more bluish than olive grey. The difference in size is probably due to sexual dimorphism, the Poowong type being a female while the Lightning Creek specimens are definitely males. There is no doubt that the Lightning Creek frogs are *maculata*. The present author's discussion (1957: 55) was based entirely on the type description. In the previous 56 years apparently nothing had been published which added to our knowledge of the species. Fry (1912: 97) merely noted that he had not seen it, and Nieden (1923: 236) simply repeated the type description. My discussion dealt with the salient characters which separate *maculata* from allied species, and noted that "It seems remarkable that this distinctive frog has not been collected again . . . especially as Poowong in Gippsland is only about 60 miles from Melbourne". It appeared to me then that the species was valid. Since 1957 sole comment seems to have been by Moore (1961), who did not study a specimen. He excludes *maculata* in his synoptic list of Australian amphibians as a valid species, but includes it as a doubtful one (p. 331). He mentions it again: "Status uncertain; possibly *Hyla citropa*" (p. 344), and excludes it from his list of 19 frogs, including five *Hylas*, from Victoria (p. 357). It is an interesting fact that Aberfeldy, the only locality I know where *citropa* has been reported from Victoria, is only about 50 miles from Poowong and in much the same type of country. However, *citropa* differs strikingly from *maculata* in many characters. A few are the distinct tympanum, less webbing between the fingers, much less webbing between the toes (average 42% against 94%), stronger vomerine elevations, and presence of a well-marked colour pattern. In spite of these well-marked differences there is no specialized feature which would preclude a common origin; but there are general morphological similarities which indicate that *citropa* and *maculata* share a remote derivation from a, probably long extinct, ancestral species. I am able to remove any doubt as to identification by examining the type of *maculata*, which Mr. Charles W. Brāzenor, Director of the National Museum of Victoria, kindly made possible by forwarding the specimen to the Australian Museum. He said in reply to my inquiry: "We have the type specimen in the museum (No. D.8498), though, like many frogs, it has not preserved well. It is simply labelled 'Powong'." The type is somewhat hardened and distorted, but, allowing for the fact that it has been preserved for 60 years and that even living specimens are drab in colour, it is still in a very fair state. Although the type was available it was thought better to use A.C.6877 as the basis of the standard description because more and clearer detail could be made out. There are no diagnostic breaks between D.8498 and A.C.6877, differences being

only of degree and mainly due to the big contrast in size. The tympanic area can fairly be described as "not visible" at first glance, but with careful inspection it can be distinguished as a rounded, rough, skin-covered area in certain lights. It is slightly more distinct than in the Lightning Creek frogs. The head is wider than long (18 to 15 mm.). The canthus rostralis is distinctly angular. The snout measures 7·5 mm., the eye and internasal space each 5 mm. Webbing of the toes is practically complete, and of fingers scanty but quite noticeable, especially between 3rd and 4th. The vomerine elevations are just behind the posterior level of the choanae. There is a mere suggestion of a pectoral fold. Details of the skin, with its small but very distinct dorsal pitting, coarsely granulate venter, limbs which are as identical as may be even to the concave, cup-like discs, body proportions which are difficult to measure, and other remarks hold good for both A.C.6877 and D.8498. The Lightning Creek specimens were collected on snags partly submerged in the shallow water of fast-flowing Snowy Creek. Lightning Creek is a locality marked on the map near the junction of Lightning Creek itself and Snowy Creek. The elevation is about 1,500 feet. Much the same type of well-timbered country extends to Poowong, which is, however, at a somewhat lower elevation (600 ft.). So *maculata* probably occurs in suitable habitats throughout the 150 miles between Lightning Creek and Poowong and also in the triangle whose third point is Glenrowan. It could quite easily extend its range into New South Wales, both Lightning Creek and Glenrowan being only 30 miles or so from the border. *Maculata* affords an illustration of valid basing of a species on a single specimen; which must normally be accepted as poor modern taxonomic practice. However, this procedure must have justification under circumstances when the possibility of the presence of an abnormal or pathological specimen has been examined and ruled out and the individual still does not fit any specific category. I am certain that the same position which applies to *Hyla maculata* also holds for *Hyla irrorata** De Vis (1884: 128) and *Hyla jenolanensis* Copland (1957: 97). I have seen a specimen of each species. Examination of the three further specimens and re-examination of the type not only firmly establishes *maculata* as a member of the Victorian fauna and provides additional information, but gives reason for hope that this interesting *Hyla* will become better known.

Acknowledgements.—I wish to thank Dr. J. W. Evans and Professor L. C. Birch for affording me facilities at the Australian Museum and the Zoology Department in the University of Sydney. Mr. Charles W. Brazenor kindly supplied information and enabled me to examine the type of *maculata* in his charge at the National Museum, Melbourne. I am obliged to the Department of Crown Lands and Survey, Melbourne, for details concerning localities and their elevations.

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* The position of *irrorata* has been complicated by the fact that the type has been lost, vide Fry (1912: 100), also Copland (1957: 34). The only other known specimen, J.9255 in the Queensland Museum, from Dalby, Queensland, is here designated the neotype.